CLAIMS

1. A method of recovering first and second data streams transmitted simultaneously via a wireless channel in a wireless communication system, comprising:

deriving a first channel estimate for the wireless channel based on received symbols;

performing detection for the first data stream using the first channel estimate;

deriving a second channel estimate based on the detected first data stream;

deriving a third channel estimate based on the first and second channel estimates; and

performing detection for the second data stream using the third channel estimate.

2. The method of claim 1, wherein the first channel estimate for the wireless channel is derived based on received pilot symbols.

3. The method of claim 1, further comprising:

estimating interference due to the first data stream using the third channel estimate, and wherein the detection for the second data stream is performed with the estimated interference from the first data stream canceled.

4. The method of claim 3, wherein the first and second data streams are combined prior to transmission via the wireless channel.

5. The method of claim 1, wherein the deriving a first channel estimate includes

obtaining a frequency response estimate for the wireless channel based on the received pilot symbols,

deriving a time-domain impulse response estimate for the wireless channel based on the frequency response estimate, and

deriving the first channel estimate based on the time-domain impulse response estimate.

6. The method of claim 5, wherein the time-domain impulse response estimate is derived by performing an inverse fast Fourier transform (IFFT) on the frequency response estimate, and wherein the first channel estimate is derived by performing a fast Fourier transform (FFT) on the time-domain impulse response estimate.

7. The method of claim 1, wherein the deriving a second channel estimate includes

obtaining a frequency response estimate for the wireless channel based on the detected first data stream,

deriving a time-domain impulse response estimate for the wireless channel based on the frequency response estimate, and

deriving the second channel estimate based on the time-domain impulse response estimate.

8. The method of claim 1, wherein the first and second channel estimates are time-domain impulse response estimates, and wherein the third channel estimate is a frequency response estimate derived by combining and transforming the time-domain impulse response estimates for the first and second channel estimates.

9. The method of claim 1, wherein the first channel estimate comprises channel gain estimates for a first group of subbands and the second channel estimate comprises channel gain estimates for a second group of subbands, and wherein the third channel estimate is derived based on a concatenation of the channel gain estimates for the first and second groups of subbands.

10. The method of claim 9, wherein the third channel estimate is derived by frequency interpolation of the channel gain estimates for the first and second groups of subbands.

11. The method of claim 9, wherein the first group of subbands is used for pilot transmission and the second group of subbands is used for data transmission.

12. The method of claim 1, wherein the detection for the first data stream is performed on received data symbols and provides detected symbols for the first data stream.

13. The method of claim 12, further comprising:

decoding the detected symbols for the first data stream to obtain decoded data for the first data stream; and

re-encoding the decoded data to obtain remodulated symbols for the first data stream, and wherein the second channel estimate is derived based on the remodulated symbols and the received data symbols.

14. The method of claim 12, further comprising:

mapping the detected symbols for the first data stream to modulation symbols based on a modulation scheme used for the first data stream, and wherein the second channel estimate is derived based on the modulation symbols and the received data symbols.

15. The method of claim 1, wherein the deriving a third channel estimate includes

scaling the first channel estimate with a first scaling factor,

scaling the second channel estimate with a second scaling factor, and

combining the scaled first channel estimate and the scaled second channel estimate to obtain the third channel estimate.

16. The method of claim 15, wherein the first and second scaling factors are selected based on reliability of the first channel estimate relative to reliability of the second channel estimate.

17. The method of claim 1, further comprising:

filtering the first channel estimate, and wherein the third channel estimate is derived based on the filtered first channel estimate.

18. The method of claim 1, further comprising:

filtering the second channel estimate, and wherein the third channel estimate is derived based on the filtered second channel estimate.

19. The method of claim 1, further comprising:

filtering the third channel estimate, and wherein the detection for the second data stream is performed using the filtered third channel estimate.

20. The method of claim 1, further comprising:

filtering the first, second, or third channel estimate in time domain or frequency domain.

21. The method of claim 20, wherein the filtering is performed with an infinite impulse response (IIR) filter.

22. The method of claim 20, wherein the filtering is performed with a finite impulse response (FIR) filter.

23. The method of claim 1, wherein the wireless communication system utilizes orthogonal frequency division multiplexing (OFDM).

24. The method of claim 23, wherein the received pilot symbols are obtained in each OFDM symbol period and for a set of subbands used for pilot transmission.

25. The method of claim 23, wherein the received pilot symbols are obtained for OFDM symbol periods used for pilot transmission, wherein the first channel estimate is derived for each OFDM symbol period used for pilot transmission, and wherein the second channel estimate is derived for each OFDM symbol period used for data transmission.

26. The method of claim 1, wherein the wireless communication system is a multiple-input multiple-output (MIMO) communication system, and wherein the first and second data streams are transmitted simultaneously from a plurality of antennas.

27. An apparatus operable to recover first and second data streams transmitted simultaneously via a wireless channel in a wireless communication system, comprising:

a channel estimator operative to derive a first channel estimate for the wireless channel based on received symbols, derive a second channel estimate based on detected symbols for the first data stream, and derive a third channel estimate based on the first and second channel estimates; and

a detector operative to perform detection for the first data stream using the first channel estimate, provide the detected symbols for the first data stream, perform detection for the second data stream using the third channel estimate, and provide detected symbols for the second data stream.

28. The apparatus of claim 27, wherein the detector is further operative to estimate interference due to the first data stream using the third channel estimate and to perform detection for the second data stream with the estimated interference from the first data stream canceled.

29. The apparatus of claim 27, further comprising:

a receive data processor operative to decode the detected symbols for the first data stream to obtain decoded data for the first data stream and to re-encode the decoded data to obtain remodulated symbols for the first data stream, and

wherein the channel estimator is operative to derive the second channel estimate based on the remodulated symbols and received data symbols.

30. An apparatus operable to recover first and second data streams transmitted simultaneously via a wireless channel in a wireless communication system, comprising:

means for deriving a first channel estimate for the wireless channel based on received symbols;

means for performing detection for the first data stream using the first channel estimate;

means for deriving a second channel estimate based on the detected first data stream;

means for deriving a third channel estimate based on the first and second channel estimates; and

means for performing detection for the second data stream using the third channel estimate.

31. The apparatus of claim 30, further comprising:

means for estimating interference due to the first data stream using the third channel estimate, and wherein the detection for the second data stream is performed with the estimated interference from the first data stream canceled.

32. The apparatus of claim 30, further comprising:

means for decoding detected symbols for the first data stream to obtain decoded data for the first data stream, and

means for re-encoding the decoded data to obtain remodulated symbols for the first data stream, and wherein the second channel estimate is derived based on the remodulated symbols and received data symbols.

33. A method of recovering a base stream and an enhancement stream transmitted simultaneously via a wireless channel in a wireless communication system, comprising:

deriving a first channel estimate for the wireless channel based on received pilot symbols;

performing detection for the base stream using the first channel estimate to obtain detected symbols for the base stream;

decoding the detected symbols for the base stream to obtain decoded data for the base stream;

re-encoding the decoded data for the base stream to obtain remodulated symbols for the base stream;

deriving a second channel estimate based on the remodulated symbols;

deriving a third channel estimate based on the first and second channel estimates;

estimating interference due to the base stream using the third channel estimate;

performing detection for the enhancement stream, with the estimated interference from the base stream canceled and using the third channel estimate, to obtain detected symbols for the enhancement stream; and

decoding the detected symbols for the enhancement stream to obtain decoded data for the enhancement stream.

34. The method of claim 33, wherein the deriving a first channel estimate includes

obtaining a frequency response estimate for the wireless channel based on the received pilot symbols,

deriving an impulse response estimate for the wireless channel based on the frequency response estimate, and

deriving the first channel estimate based on the impulse response estimate.